7. Stone and Screenings.—The road stone for the new surface coating should be stone of approved quality, broken as cubically as possible, and should contain about 70 per cent. of stone, which will pass through a 2½-in. ring, but which will not pass through a 1¾-in. ring, about 20 per cent. which will pass through a 1¾-in. ring, but which will not pass through a screen with rods ¾ in. apart. The screenings forming the residue from the above, which will be obtained by the use of the ¾ in. rod screen, should be kept separate and used as a top dressing during rolling operations.

8. Spreading.—The stone must be spread by careful men selected for their knowledge and experience of such work, as the durability and evenness of wear of the surface obtained by steam-rolled coatings greatly depends on judicious uniform spreading. The whole of the stone should be turned over in the process of spreading. Care must be taken not to allow the stone to be tipped upon the road close to the point of spreading, as this prevents a thorough turning over of the material in the act of spreading. When stones are transported by rail or by road over long distances the different sizes of stone are liable to separate themselves, and it is important that during the act of spreading they should be well mixed, so as to obviate the possibility of having larger stones on some parts of the road and smaller stones on other parts.

Note.—One ton to cover 8 to 9 square yards may be taken as an average quantity required to give a consolidated thickness of 3 in.

When stones are spread in thick coatings so that 1 ton covers less than 8 yards, there is a greater liability to unequal consolidation, inasmuch as stones are pushed in front of the roller until the roller surmounts them and thus a corrugated or wavy surface is formed.

9. Rolling.—The rolling should be carried out by a roller of a weight of about 10 tons. This must be in charge of a skilled driver who has been specially trained for the purpose. The macadam should be consolidated by starting the work at the sides and gradually working towards the centre. No water or binding should be applied until dry rolling has been carried out to a sufficient extent to form a smooth, hard surface with the correct cross-fall, with the stones well knit together, and showing their faces on the surface. The cross section of the newly rolled surface should be frequently checked by the use of a long straight-edge and level to ensure that the cross-fall of 1 in 24 is correctly obtained. No spreading or rolling is to be carried out in frosty weather. When the road cannot be entirely closed to traffic, care should be taken to minimize inconvenience to the travelling public during the progress of the work by coating one-half of the width at one time. No unrolled stone should be left on the road overnight. Care should be taken not to leave a vertical or steep edge of the new coating, but the edge should be thinned out so as to afford an easy passage from the new coating to the old surface. Notice boards warning the public that steam rolling work is in progress should be placed at reasonable distances from each end of the work.

10. Binding.—The binding material should be the best reasonably obtained. It should be either of the same material as the new coating, or of granite, lime-stone, or slag chippings, or, failing these, suitable pit gravel and the largest stone in it should not exceed ¾ in. in its greatest dimension. The binding material is not to be applied until the stones have been tightly rolled, as above described. It should then be spread, watered, and swept over the surface during the final rolling operations, working it from the channels towards the centre so as to fill the interstices or voids between the rolled stones. Care should be taken not to use more binding material or water than is absolutely necessary to ensure proper consolidation. The success of water-bound steam rolling so greatly depends on the quality and quantity of the binding material used that extreme care should be taken in its selection and application.

11. Re-rolling.—In some cases it is advisable that a steam-rolled waterbound macadam surface should be lightly watered and re-rolled from a week to a fortnight after the first rolling.

12. Records.—A careful daily record should be kept of all particulars of the work, the number of men employed, the time occupied, the quantity of material used, the area of new coating finished, and also of the state of the weather and other details.

Appendix to Road Board Specification No. 7.—In preparing for the reconstruction of roads which require a preliminary examination and reformation of contour before a steam-rolled macadam surface can be satisfactorily applied to them, attention should be given to the following points and careful records kept for future reference:

1. The relative levels of the intended road surface and that of the adjoining lands.
2. The means of disposing of surface water by drainage.
3. The nature of the fences.
4. The width of the carriageway and the full width between fences.
5. The gradients of the road.
6. The character and condition of the existing carriageway and indications of any special features of weakness or wear.
7. The cross-section of road from fence to fence.
8. The material previously used for surfacing work and most readily obtainable for road construction and the cost thereof.
9. The requirements as to foundations.
10. The points at which, on account of soft wet clay or bog or marshy sub-soil special means are to be adopted. Good results can be obtained in some cases by supporting the road crust on a layer of dry ashes or clayey gravel, or by spreading heather or faggots, but in each case the local circumstances and conditions must determine the means to be adopted.
11. Whether it is desirable to have footpaths on one or both sides of the road.

LOS ANGELES AQUEDUCT HYDRO-ELECTRIC PROJECT.

The city of Los Angeles has recently approved a bond issue amounting to $357,367 to complete the equipment of the hydro-electric project to be operated in connection with the 250-mile aqueduct by which the city water is brought from Owens Lake, near the Yosemite National Park.

The generating equipment will be installed at Power House No. 1, located at San Franciscedo, 47 miles from Los Angeles, to which point current is sent at 60,000 volts.

In the power house there will be installed three 9,375-kva., 6,600-volt, 50-cycle, three-phase water wheel generators running at 200 r.p.m.; and two 250-kw., 250-volt direct-current water wheel generators used as exciters; ten 3,150-kva., single-phase, 50-cycle oil insulated water-cooled transformers for raising the generator voltage (6,600) to that of the transmission, 60,000.

In the sub-station there will be installed nine 5,000-kva. single-phase, oil insulated water cooled transformers for stepping down the transmission voltage to either 33,000 or 16,000 for secondary distribution.

The contract for the entire equipment was awarded to the Westinghouse Electric & Manufacturing Company.